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EXAMINER	
ROE, JESSEE RANDALL	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/654,203	Applicant(s) RAKOWSKI, JAMES A.
	Examiner Jessee Roe	Art Unit 1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 28 August 2009.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-6,9-11,13,14,16,18,20-28 and 99-101 is/are pending in the application.

4a) Of the above claim(s) 6,14,23,24,27 and 28 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-5, 9-11, 13, 16, 18, 20-22, 25-26 and 99-101 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

Claims 1-6, 9-11, 13-14, 16, 18, 20-28 and 99-101 are pending wherein claims 1-4, 9-11, 13-14, 16, 18 and 20-28 are amended, claims 7-8, 12, 15, 17, 19 and 25-98 are canceled, claims 99-101 are new, and claims 6, 14, 23-24 and 27-28 are withdrawn from consideration.

Status of Previous Rejections

The previous rejection of claim 25 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention is withdrawn in view of the Applicant's amendment to claim 25. The previous rejection of claims 1-5, 9-11, 13, 16, 18, 20-22, 25-26 under 35 U.S.C. 103(a) as being unpatentable over Suda (JP 10-088391) in view of Ono (JP 10-280103) is withdrawn in view of the Applicant's arguments.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 11, 13, 16, 18, 20-22, 25-26 and 101 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a

way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In regards to claim 11, the specification does not contain support for the ferritic stainless steel being “uncoated” as claimed.

In regards to claim 101, the specification does not provide support for the heating only a single surface of the ferritic stainless steel in an oxidizing atmosphere at a temperature in the range of 750°C to 850°C.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 99-101 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to the recitation “aluminum-rich the oxide scale comprising iron and chromium and having a hematite structure, a_o in the range of 4.95 to 5.04Å, and c_o in the range of 13.58 to 13.75 Å" in claim 99, it is unclear if aluminum is included in the oxide scale or if aluminum is lacking from the oxide scale.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-5, 9-11, 13, 16, 18, 20-22, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishibashi (US 4,097,311).

In regards to claims 1 and 10-11 Ishibashi (‘311) discloses electrolytically polishing (electropolishing) ferritic stainless steel articles (which would include uncoated (exposed, as in amended claims 1, 10, 11, 13 and 26) ferritic stainless steel articles) used for a solar collector (col. 3, lines 28-53 and col. 7, lines 34-50). Ishibashi (‘311) further discloses that the stainless steel composition would include 11 to 30 weight percent chromium (col. 3, lines 28-34) and 0.001 to 5 weight percent of at least one element selected from the group of nitrogen, copper, aluminum vanadium, yttrium, titanium, niobium, tantalum, uranium, tungsten, zirconium and hafnium (col. 4, lines 15-22), which encompasses the newly amended claimed range of 0.2 to 1.0 weight percent aluminum. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the claimed amounts of chromium, aluminum, and yttrium from the amounts disclosed by Ishibashi (’311) because Ishibashi (‘311) discloses the same utility throughout the disclosed ranges.

With respect to the recitations “so that, when subjected to an oxidizing atmosphere at high temperature, the electropolished surface develops an electrically conductive, aluminum-rich, oxidation resistant oxide scale comprising chromium and iron and having a hematite structure differing from Fe_2O_3, alpha Cr_2O_3, and alpha Al_2O_3” as recited in lines 9-13 of claim 1, “wherein lattice parameters differ from a_o and c_o of Fe_2O_3, alpha Cr_2O_3, and alpha Al_2O_3” as recited in claim 2, and “wherein the oxide scale is characterized by lattice parameters a_o in the range of 4.95 to 5.04 Å and

c_o in the range of 13.58 to 13.75 Å" of claim 5, Ishibashi ('311) discloses an $(FeCr)_2O_3$ oxide (col. 5, lines 14-19). Additionally, Ishibashi ('311) discloses processing substantially the same composition by the same process (electropolishing). Therefore, the claimed structure and lattice parameters would be expected. MPEP 2112.01 I.

With respect to the amended recitations "wherein the at least one exposed electropolished surface develops the oxide scale when heated in an oxidizing atmosphere at a temperature in the range of 750°C to 850°C." of claim 3, "wherein the at least one exposed electropolished surface develops the oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C." of claim 4 and "wherein the exposed electropolished surface develops the oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C, and wherein the oxide scale is characterized by a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of claim 9, the Examiner notes that these recitations would not be an active step in the process as claimed and are therefore considered a property that would result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

With respect to the amended recitation "so that the exposed electropolished surface develops an aluminum-rich oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C, the oxide scale comprising iron and chromium and having a hematite structure, a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of lines 9-13 of claim 10, the

Examiner notes that this recitation would not be an active step in the process as claimed and is therefore considered a property that would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

With respect to the amended recitation ”wherein the at least one exposed electropolished surface develops an aluminum-rich oxide scale comprising iron and chromium and having a hematite structure a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å, when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C." of claim 13, the Examiner notes that this recitation would not be an active step in the process as claimed and is therefore considered a property that would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

In regards to claims 16 and 18, Ishibashi (‘311) further discloses that the stainless steel composition would include 0.001 to 5 weight percent of at least one element selected from the group of nitrogen, copper, aluminum vanadium, yttrium, titanium, niobium, tantalum, uranium, tungsten, zirconium and hafnium (col. 4, lines 15-22), which would include the amended range of "0.4 up to 0.8 weight percent aluminum". .

In regards to claims 20-22, Ishibashi (‘311) discloses that the stainless steel composition would include 11 to 30 weight percent chromium (col. 3, lines 28-34) and 0.001 to 5 weight percent of at least one element selected from the group of nitrogen, copper, aluminum vanadium, yttrium, titanium, niobium, tantalum, uranium, tungsten, zirconium and hafnium (col. 4, lines 15-22).

With respect to the recitation “wherein electropolishing the at least one exposed surface improves resistance of the at least one surface to oxidation when subjected to a temperature and an atmosphere characteristic of operating conditions within a solid oxide fuel cell” of claim 26, the Examiner notes Ishibashi (‘311)discloses the same or a substantially similar composition and the same processing. Therefore, this property would be expected. MPEP 2112.01 I.

Claims 1-5, 9-11, 13, 16, 18, 20-22, 25-26, 99-101 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szummer et al. (Hydrogen surface effects in ferritic stainless steels) in view of Ono (JP 10-280103).

In regards to claims 1 and 10-11, Szummer et al. discloses a method for preparing ferritic stainless steels (which would include uncoated and exposed stainless steel) containing 16 weight percent, 17 weight percent and 19.3 weight percent chromium comprising electropolishing the stainless steel (page 356, column 2).

Szummer et al. discloses a method of preparing ferritic stainless steels as described above, but Szummer et al. does not specify that the ferritic stainless steels would comprise at least 0.2 weight percent aluminum and a total weight of rare earth metals from 0.02 to 1.0 weight percent.

Ono (JP ‘103) discloses, in the same field of endeavor, adding 0 to 1 weight percent aluminum and 0 to 0.2 weight percent rare earth metals to a ferritic stainless steel alloy, having the same amount of chromium as Szummer et al., to improve oxidation (corrosion) resistance [0017] and [0019].

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added 0 to 1 weight percent aluminum and 0 to 0.2 weight percent rare earth metals, as disclosed by Ono (JP '103), to the ferritic stainless steel, as disclosed by Szummer et al., in order to improve oxidation (corrosion) resistance, as disclosed by Ono (JP '103).

With respect to the amended recitations "so that, when subjected to an oxidizing atmosphere at high temperature, the exposed electropolished surface develops an electrically conductive, aluminum-rich, oxidation resistant oxide scale comprising chromium and iron and having a hematite structure differing from Fe_2O_3, alpha Cr_2O_3, and alpha Al_2O_3" as recited in lines 9-13 of claim 1, "wherein lattice parameters differ from a_o and c_o of Fe_2O_3, alpha Cr_2O_3, and alpha Al_2O_3" as recited in claim 2, and "wherein the oxide scale is characterized by lattice parameters a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of claim 5, neither Szummer et al. nor Ono (JP '103) specify the hematite structure that would be formed. However, Szummer et al. in view of Ono (JP '103) does disclose the same or substantially the same composition in addition to the same process (electropolishing). Therefore, it would be expected that Szummer et al. in view of Ono (JP '103) would have the hematite structure and the hematite lattice parameters as claimed in the instant invention. MPEP 2112.01 I.

With respect to the recitations "wherein the at least one exposed electropolished surface develops the oxide scale when heated in an oxidizing atmosphere at a temperature in the range of 750°C to 850°C." of claim 3, "wherein the at least one

exposed electropolished surface develops the oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C." of claim 4 and "wherein the exposed electropolished surface develops the oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C, and wherein the oxide scale is characterized by a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of claim 9, the Examiner notes that these recitations would not be an active step in the process as claimed and are therefore considered a property that would result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

With respect to the amended recitation "so that the exposed electropolished surface develops an aluminum-rich oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C, the oxide scale comprising iron and chromium and having a hematite structure, a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of lines 9-13 of claim 10, the Examiner notes that this recitation would not be an active step in the process as claimed and is therefore considered a property that would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

With respect to the amended recitation "wherein the at least one exposed electropolished surface develops an aluminum-rich oxide scale comprising iron and chromium and having a hematite structure a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å, when heated in an oxidizing atmosphere for at least 100

hours at a temperature in the range of 750°C to 850°C." of claim 13, the Examiner notes that this recitation would not be an active step in the process as claimed and is therefore considered a property that would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

In regards to claim 16, Ono (JP '103) discloses adding 0 to 1 weight percent aluminum [0019], which encompasses the newly amended range of 0.4 up to 0.8 weight percent aluminum.

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In regards to claim 18, Ono (JP '103) discloses yttrium and hafnium [0017].

In regards to claim 20, Szummer et al. discloses a method for preparing ferritic stainless steels containing 16 weight percent, 17 weight percent and 19.3 weight percent chromium (page 356, column 2). Ono (JP '103) discloses 15 to 30 weight percent chromium, 0 to 1 weight percent aluminum and 0 to 0.2 weight percent rare earth metals ([0013], [0017] and [0019]).

In regards to claim 21, Ono (JP '103) discloses 0 to 2 weight percent nickel, 0 to 1 weight percent manganese, 0 to 3 weight percent silicon, 0 to 0.2 weight percent carbon, 0 to 1 weight percent titanium, and does not specify the necessity of adding nitrogen which overlaps "in weight percent, up to 3 nickel, up to 3 manganese, up to 0.7 silicon, up to 0.07 nitrogen, up to 0.07 carbon and up to 0.5 titanium, as instantly claimed (claim 4 of Ono (JP '103)).

In regards to claim 22, Ono (JP '103) discloses 15 to 30 weight percent chromium, 0 to 1 weight percent aluminum and 0 to 0.2 weight percent rare earth metals, which includes cerium and lanthanum, which overlaps "in weight percent, about

22 chromium, about 0.6 aluminum, cerium and lanthanum, wherein the sum of the weights of cerium and lanthanum is up to about 0.10" ([0013], [0017] and[0019]).

In regards to claim 25, Szummer et al. discloses electropolishing a ferritic stainless steel in a sulfuric acid solution with platinum (Materials and experimental procedure).

With respect to the amended recitation “wherein electropolishing the at least one exposed surface improves resistance of the at least one surface to oxidation when subjected to a temperature and an atmosphere characteristic of operating conditions within a solid oxide fuel cell” of claim 26, the Examiner notes Szummer et al. in view of Ono (JP ‘103) discloses the same or a substantially similar composition and the same processing. Therefore, this property would be expected. MPEP 2112.01 I.

In regards to claim 99, Szummer et al. discloses a method for preparing ferritic stainless steels containing 16 weight percent, 17 weight percent and 19.3 weight percent chromium (page 356, column 2). Ono (JP ‘103) discloses 15 to 30 weight percent chromium, 0 to 1 weight percent aluminum and 0 to 0.2 weight percent rare earth metals ([0013], [0017] and [0019]).

Ono (JP ‘103) discloses, in the same field of endeavor, adding 0 to 1 weight percent aluminum and 0 to 0.2 weight percent rare earth metals (which would include cerium, lanthanum, praseodymium) to a ferritic stainless steel alloy, having a substantially similar amount of chromium as Suda (JP '391), to improve oxidation (corrosion) resistance [0017] and [0019].

Therefore, it would have been obvious to one of ordinary skill in the art at the

time the invention was made to have added 0 to 1 weight percent aluminum and 0 to 0.2 weight percent rare earth metals, as disclosed by Ono (JP ‘103), to the ferritic stainless steel, as disclosed by Szummer et al., in order to improve oxidation (corrosion) resistance, as disclosed by Ono (JP ‘103).

With respect to the recitation “wherein the electropolishing chemically modifies the at least one exposed surface of the ferritic stainless steel so that the electropolished exposed surface develops an aluminum-rich oxide scale when heated in an oxidizing atmosphere at a temperature in the range of 750°C to 850°C, aluminum-rich the oxide scale comprising iron and chromium and having a hematite structure, a_o in the range of 4.95 to 5.04 Å, and c_o in the range of 13.58 to 13.75 Å” in claim 99, the Examiner notes that Szummer et al. in view of Ono (JP ‘103) discloses the same or a substantially similar composition and the same processing. Therefore, this property would be expected. MPEP 2112.01 I. The Examiner further notes that “when heated in an oxidizing atmosphere at a temperature in the range of 750°C to 850°C” would not be an active step in the process as claimed.

In regards to claim 100, Ono (JP '103) discloses oxidizing the ferritic stainless steel in the vicinity of 1000°C [0005], which would include 850°C. Therefore “an aluminum-rich oxide scale comprising iron and chromium and having a hematite structure a_o in the range of 4.95 to 5.04Å and c_o in the range of 13.58 to 13.75 Å” in Szummer et al. in view of Ono (JP ‘103) would be expected. MPEP 2112.01 I.

With respect to the recitation “wherein the electropolishing decreases the rate of

oxidation of the ferritic stainless steel by at least one order of magnitude when compared to a non-electropolished sample of the same ferritic stainless steel, when heated in an oxidizing atmosphere at a temperature in the range of 750°C to 850°C" in claim 101, the Examiner notes that Szummer et al. in view of Ono (JP '103) discloses the same or a substantially similar composition and the same processing. Therefore, this property would be expected. MPEP 2112.01 I.

Claims 1-5, 9-11, 13, 18, 21, 25-26, 99 and 101 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szummer et al. (Hydrogen surface effects in ferritic stainless steels) in view of Linden et al. (WO 99/10554).

In regards to claims 1 and 10-11, Szummer et al. discloses a method for preparing ferritic stainless steels (which would include uncoated and exposed stainless steel) containing 16 weight percent, 17 weight percent and 19.3 weight percent chromium comprising electropolishing the stainless steel (page 356, column 2).

Szummer et al. discloses a method of preparing ferritic stainless steels as described above, but Szummer et al. does not specify that the ferritic stainless steels would comprise at least 0.2 weight percent aluminum and a total weight of rare earth metals from 0.02 to 1.0 weight percent.

Linden et al. (WO '554) discloses ferritic stainless steels comprising 15 to 25 weight percent chromium wherein 3 to 7 weight percent aluminum would be added to form a protective oxide layer and 0 to 0.5 weight percent of cerium, lanthanum, yttrium, and hafnium would be added to improve adhesion of the oxide layer (abstract,

page 3, lines 15-32, page 4, lines 17-32 and page 7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add 3 to 7 weight percent aluminum and 0 to 0.5 weight percent of cerium, lanthanum, yttrium, and hafnium, as disclosed by Linden et al. (WO '554), to the ferritic stainless steel containing 16 weight percent, 17 weight percent and 19.3 weight percent chromium, as disclosed by Szummer et al., in order to form a protective oxide layer and improve adhesion of the oxide layer, as disclosed by Linden et al. (WO '554) (abstract, page 4, lines 17-32 and page 7).

With respect to the amended recitations "so that, when subjected to an oxidizing atmosphere at high temperature, the exposed electropolished surface develops an electrically conductive, aluminum-rich, oxidation resistant oxide scale comprising chromium and iron and having a hematite structure differing from Fe_2O_3, alpha Cr_2O_3, and alpha Al_2O_3" as recited in lines 9-13 of claim 1, "wherein lattice parameters differ from a_o and c_o of Fe_2O_3, alpha Cr_2O_3 , and alpha Al_2O_3" as recited in claim 2, and "wherein the oxide scale is characterized by lattice parameters a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of claim 5, neither Szummer et al. nor Linden et al. (WO '554) specify the hematite structure that would be formed. However, Szummer et al. in view of Linden et al. (WO '554) does disclose the same or substantially the same composition in addition to the same process (electropolishing). Therefore, it would be expected that Szummer et al. in view of Linden et al. (WO '554) would have the hematite structure and the hematite lattice parameters as claimed in the

instant invention. MPEP 2112.01 I.

With respect to the amended recitations "wherein the at least one exposed electropolished surface develops the oxide scale when heated in an oxidizing atmosphere at a temperature in the range of 750°C to 850°C." of claim 3, "wherein the at least one exposed electropolished surface develops the oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C." of claim 4 and “wherein the exposed electropolished surface develops the oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C, and wherein the oxide scale is characterized by a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å” of claim 9, the Examiner notes that these recitations would not be an active step in the process as claimed and are therefore considered a property that would result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

With respect to the amended recitation “so that the exposed electropolished surface develops an aluminum-rich oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C, the oxide scale comprising iron and chromium and having a hematite structure, a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å” of lines 9-13 of claim 10, the Examiner notes that this recitation would not be an active step in the process as claimed and is therefore considered a property that would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

With respect to the amended recitation ”wherein the at least one exposed

electropolished surface develops an aluminum-rich oxide scale comprising iron and chromium and having a hematite structure a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å, when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C." of claim 13, the Examiner notes that this recitation would not be an active step in the process as claimed and is therefore considered a property that would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

In regards to claim 18, Linden et al. (WO '554) 0 to 0.5 weight percent of cerium, lanthanum, yttrium, and hafnium (abstract and page 7).

In regards to claim 21, Linden et al. (WO '554) discloses less than 2 weight percent nickel, less than 2 weight percent manganese, less than 2 weight percent silicon, less than 0.05 weight percent carbon, 0.005 to 0.03 weight percent titanium, and less than 0.05 weight percent nitrogen which overlaps "in weight percent, up to 3 nickel, up to 3 manganese, up to 0.7 silicon, up to 0.07 nitrogen, up to 0.07 carbon and up to 0.5 titanium, as instantly claimed (page 3, lines 15-32).

In regards to claim 25, Szummer et al. discloses electropolishing a ferritic stainless steel in a sulfuric acid solution with platinum (Materials and experimental procedure).

With respect to the amended recitation "wherein electropolishing the at least one exposed surface improves resistance of the at least one surface to oxidation when subjected to a temperature and an atmosphere characteristic of operating conditions within a solid oxide fuel cell" of claim 26, the Examiner notes Szummer et al. in view of

Linden et al. (WO ‘554) discloses the same or a substantially similar composition and the same processing. Therefore, this property would be expected. MPEP 2112.01 I.

In regards to claim 99, Szummer et al. discloses a method for preparing ferritic stainless steels containing 16 weight percent, 17 weight percent and 19.3 weight percent chromium (page 356, column 2). Ono (JP ‘103) discloses 15 to 30 weight percent chromium, 0 to 1 weight percent aluminum and 0 to 0.2 weight percent rare earth metals ([0013], [0017] and [0019]).

Linden et al. (WO ‘554) discloses ferritic stainless steels comprising 15 to 25 weight percent chromium wherein 3 to 7 weight percent aluminum would be added to form a protective oxide layer and 0 to 0.5 weight percent of cerium, lanthanum, yttrium, and hafnium would be added to improve adhesion of the oxide layer (abstract, page 3, lines 15-32, page 4, lines 17-32 and page 7).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add 3 to 7 weight percent aluminum and 0 to 0.5 weight percent of cerium, lanthanum, yttrium, and hafnium, as disclosed by Linden et al. (WO ‘554), to the ferritic stainless steel containing 16 weight percent, 17 weight percent and 19.3 weight percent chromium, as disclosed by Szummer et al., in order to form a protective oxide layer and improve adhesion of the oxide layer, as disclosed by Linden et al. (WO ‘554) (abstract, page 4, lines 17-32 and page 7).

With respect to the recitation “wherein the electropolishing chemically modifies the at least one exposed surface of the ferritic stainless steel so that the electropolished

exposed surface develops an aluminum-rich oxide scale when heated in an oxidizing atmosphere at a temperature in the range of 750°C to 850°C, aluminum-rich the oxide scale comprising iron and chromium and having a hematite structure, a_o in the range of 4.95 to 5.04 Å, and c_o in the range of 13.58 to 13.75 Å" in claim 99, the Examiner notes that Szummer et al. in view of Linden et al. (WO '554) discloses the same or a substantially similar composition and the same processing. Therefore, this property would be expected. MPEP 2112.01 I. The Examiner further notes that "when heated in an oxidizing atmosphere at a temperature in the range of 750°C to 850°C" would not be an active step in the process as claimed.

With respect to the recitation "wherein the electropolishing decreases the rate of oxidation of the ferritic stainless steel by at least one order of magnitude when compared to a non-electropolished sample of the same ferritic stainless steel, when heated in an oxidizing atmosphere at a temperature in the range of 750°C to 850°C" in claim 101, the Examiner notes that Szummer et al. in view of Linden et al. (WO '554) discloses the same or a substantially similar composition and the same processing. Therefore, this property would be expected. MPEP 2112.01 I.

Claims 1-5, 9-11, 13, 18, 21, 25-26, 99 and 101 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szummer et al. (Hydrogen surface effects in ferritic stainless steels) in view of Uematsu et al. (JP 06-172933).

In regards to claims 1 and 10-11, Szummer et al. discloses a method for preparing ferritic stainless steels (which would include uncoated and exposed stainless

steel)containing 16 weight percent, 17 weight percent and 19.3 weight percent chromium comprising electropolishing the stainless steel (page 356, column 2).

Szummer et al. discloses a method of preparing ferritic stainless steels as described above, but Szummer et al. does not specify that the ferritic stainless steels would comprise at least 0.2 weight percent aluminum and a total weight of rare earth metals from 0.02 to 1.0 weight percent.

Uematsu et al. (JP '933) discloses adding 1 to 4.5 weight percent aluminum, to maintain high temperature oxidation resistance, and 0.01 to 0.15 weight percent rare earth metals such as cerium, lanthanum, and yttrium, to improve adhesion of the oxide film, for a ferritic stainless steel having 15 to 25 weight percent chromium ([0012-0013] and [0015-0016]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added 1 to 4.5 weight percent aluminum and 0.01 to 0.15 weight percent rare earth metals such as cerium, lanthanum, and yttrium, as disclosed by Uematsu et al. (JP '933), to the ferritic stainless steels, as disclosed by Szummer et al., in order to maintain high temperature oxidation resistance and improve adhesion of the oxide film, as disclosed by Uematsu et al. (JP '933) (abstract, [0012-0013] and [0015-0016]).

With respect to the amended recitations "so that, when subjected to an oxidizing atmosphere at high temperature, the exposed electropolished surface develops an electrically conductive, aluminum-rich, oxidation resistant oxide scale comprising chromium and iron and having a hematite structure differing from Fe_2O_3, alpha Cr_2O_3,

and alpha Al_2O_3" as recited in lines 9-13 of claim 1, "wherein lattice parameters differ from a_o and c_o of Fe_2O_3, alpha Cr_2O_3 , and alpha Al_2O_3" as recited in claim 2, and "wherein the oxide scale is characterized by lattice parameters a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of claim 5, neither Szummer et al. nor Uematsu et al. (JP '933) specify the hematite structure that would be formed. However, Szummer et al. in view of Uematsu et al. (JP '933) does disclose the same or substantially the same composition in addition to the same process (electropolishing). Therefore, it would be expected that Szummer et al. in view of Uematsu et al. (JP '933) would have the hematite structure and the hematite lattice parameters as claimed in the instant invention. MPEP 2112.01 I.

With respect to the amended recitations "wherein the at least one exposed electropolished surface develops the oxide scale when heated in an oxidizing atmosphere at a temperature in the range of 750°C to 850°C." of claim 3, "wherein the at least one exposed electropolished surface develops the oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C." of claim 4 and "wherein the exposed electropolished surface develops the oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C, and wherein the oxide scale is characterized by a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of claim 9, the Examiner notes that these recitations would not be an active step in the process as claimed and is therefore considered a property that would result from the electropolishing of a ferritic

stainless steel. MPEP 2112.01 I.

With respect to the amended recitation “so that the exposed electropolished surface develops an aluminum-rich oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C, the oxide scale comprising iron and chromium and having a hematite structure, a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å” of lines 9-13 of claim 10, the Examiner notes that this recitation would not be an active step in the process as claimed and is therefore considered a property that would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

With respect to the amended recitation ”wherein the at least one exposed electropolished surface develops an aluminum-rich oxide scale comprising iron and chromium and having a hematite structure a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å, when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C." of claim 13, the Examiner notes that this recitation would not be an active step in the process as claimed and is therefore considered a propertythat would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

In regards to claim 18, Uematsu et al. (JP ‘933) discloses 0.01 to 0.15 weight percent rare earth metals such as cerium, lanthanum, and yttrium [0015-0016].

In regards to claim 21, Uematsu et al. (JP ‘933) discloses 0 to 0.03 weight percent nitrogen, 0 to 0.3 weight percent manganese, 0 to 0.2 weight percent silicon, 0

to 0.03 weight percent carbon, 0.01 to 0.5 weight percent titanium, and does not specify the necessity of adding nickel which overlaps "in weight percent, up to 3 nickel, up to 3 manganese, up to 0.7 silicon, up to 0.07 nitrogen, up to 0.07 carbon and up to 0.5 titanium, as instantly claimed (abstract).

In regards to claim 25, Szummer et al. discloses electropolishing a ferritic stainless steel in a sulfuric acid solution with platinum (Materials and experimental procedure).

With respect to the amended recitation “wherein electropolishing the at least one exposed surface improves resistance of the at least one surface to oxidation when subjected to a temperature and an atmosphere characteristic of operating conditions within a solid oxide fuel cell” of claim 26, the Examiner notes Szummer et al. in view of Uematsu et al. (JP ‘933) discloses the same or a substantially similar composition and the same processing. Therefore, this property would be expected. MPEP 2112.01 I.

In regards to claim 99, Szummer et al. discloses a method for preparing ferritic stainless steels containing 16 weight percent, 17 weight percent and 19.3 weight percent chromium (page 356, column 2). Ono (JP ‘103) discloses 15 to 30 weight percent chromium, 0 to 1 weight percent aluminum and 0 to 0.2 weight percent rare earth metals ([0013], [0017] and [0019]).

Uematsu et al. (JP ‘933) discloses adding 1 to 4.5 weight percent aluminum, to maintain high temperature oxidation resistance, and 0.01 to 0.15 weight percent rare earth metals such as cerium, lanthanum, and yttrium, to improve adhesion of the oxide film, for a ferritic stainless steel having 15 to 25 weight percent chromium ([0012-

0013] and [0015-0016]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added 1 to 4.5 weight percent aluminum and 0.01 to 0.15 weight percent rare earth metals such as cerium, lanthanum, and yttrium, as disclosed by Uematsu et al. (JP '933), to the ferritic stainless steels, as disclosed by Szummer et al., in order to maintain high temperature oxidation resistance and improve adhesion of the oxide film, as disclosed by Uematsu et al. (JP '933) (abstract, [0012-0013] and [0015-0016]).

With respect to the recitation "wherein the electropolishing decreases the rate of oxidation of the ferritic stainless steel by at least one order of magnitude when compared to a non-electropolished sample of the same ferritic stainless steel, when heated in an oxidizing atmosphere at a temperature in the range of 750°C to 850°C" in claim 101, the Examiner notes that Szummer et al. in view of Uematsu et al. (JP '933) discloses the same or a substantially similar composition and the same processing. Therefore, this property would be expected. MPEP 2112.01 I.

Claims 1-5, 9-11, 13, 16, 18, 20-22, 25-26, 99 and 101 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szummer et al. (Hydrogen surface effects in ferritic stainless steels) in view of Matsui et al. (JP 09-209092).

In regards to claims 1 and 10-11, Szummer et al. discloses a method for preparing ferritic stainless steels (which would include uncoated and exposed stainless steel) containing 16 weight percent, 17 weight percent and 19.3 weight percent chromium comprising electropolishing the stainless steel (page 356, column 2).

Szummer et al. discloses a method of preparing ferritic stainless steels as described above, but Szummer et al. does not specify that the ferritic stainless steels would comprise at least 0.2 weight percent aluminum and a total weight of rare earth metals from 0.02 to 1.0 weight percent.

Matsui et al. (JP ‘092) discloses adding 0.01 to 2 weight percent aluminum, in order to improve high temperature oxidation (corrosion) resistance, and 0.001 to 0.05 of rare earth metals such as yttrium, in order to improve the oxide film, to stainless steel having 20 to 80 volume percent ferritic phase (ferritic stainless steel) and 15 to 27 weight percent chromium (abstract and [0018]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added 0.01 to 2 weight percent aluminum and 0.001 to 0.05 weight percent rare earth metals such as yttrium, as disclosed by Matsui et al. (JP ‘092), to the ferritic stainless steels, as disclosed by Szummer et al., in order to maintain high temperature oxidation resistance and improve adhesion of the oxide film, as disclosed by Matsui et al. (JP ‘092) (abstract and [0018]).

With respect to the amended recitations “so that, when subjected to an oxidizing atmosphere at high temperature, the exposed electropolished surface develops an electrically conductive, aluminum-rich, oxidation resistant oxide scale comprising chromium and iron and having a hematite structure differing from Fe_2O_3, alpha Cr_2O_3, and alpha Al_2O_3” as recited in lines 9-13 of claim 1, “wherein lattice parameters differ from a_o and c_o of Fe_2O_3, alpha Cr_2O_3 , and alpha Al_2O_3” as recited in claim 2, and

"wherein the oxide scale is characterized by lattice parameters a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of claim 5, neither Szummer et al. nor Matsui et al. (JP '092) specify the hematite structure that would be formed. However, Szummer et al. in view of Matsui et al. (JP '092) does disclose the same or substantially the same composition in addition to the same process (electropolishing). Therefore, it would be expected that Szummer et al. in view of Matsui et al. (JP '092) would have the hematite structure and the hematite lattice parameters as claimed in the instant invention. MPEP 2112.01 I.

With respect to the amended recitations "wherein the at least one exposed electropolished surface develops the oxide scale when heated in an oxidizing atmosphere at a temperature in the range of 750°C to 850°C." of claim 3, "wherein the at least one exposed electropolished surface develops the oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C." of claim 4 and "wherein the exposed electropolished surface develops the oxide scale when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C, and wherein the oxide scale is characterized by a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of claim 9, the Examiner notes that these recitations would not be an active step in the process as claimed and is therefore considered a property that would result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

With respect to the amended recitation "so that the exposed electropolished surface develops an aluminum-rich oxide scale when heated in an oxidizing atmosphere

for at least 100 hours at a temperature in the range of 750°C to 850°C, the oxide scale comprising iron and chromium and having a hematite structure, a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å" of lines 9-13 of claim 10, the Examiner notes that this recitation would not be an active step in the process as claimed and is therefore considered a property that would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

With respect to the amended recitation "wherein the at least one exposed electropolished surface develops an aluminum-rich oxide scale comprising iron and chromium and having a hematite structure a_o in the range of 4.95 to 5.04 Å and c_o in the range of 13.58 to 13.75 Å, when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C." of claim 13, the Examiner notes that this recitation would not be an active step in the process as claimed and is therefore considered a property that would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

In regards to claim 16, Matsui et al. (JP '092) discloses adding 0.01 to 2 weight percent aluminum [0018], which encompasses the newly amended range of 0.4 up to 0.8 weight percent aluminum.

In regards to claim 18, Matsui et al. (JP '092) discloses adding 0.001 to 0.05 of rare earth metals such as yttrium (abstract and [0018]).

In regards to claim 20, Szummer et al. discloses a method for preparing ferritic stainless steels containing 16 weight percent, 17 weight percent and 19.3 weight

percent chromium (page 356, column 2). Matsui et al. (JP ‘092) discloses 15 to 27 weight percent chromium, 0.01 to 2 weight percent aluminum and 0.001 to 0.05 of rare earth metals such as yttrium, which overlaps “in weight percent, 18 up to 22 chromium, 0.4 to 0.8 aluminum and 0.02 to 0.2 REM" as instantly claimed (abstract and [0018]).

In regards to claim 21, Matsui et al. (JP ‘092) discloses 0.01 to 0.15 weight percent nitrogen, 0.1 to 2 weight percent manganese, 0.1 to 2 weight percent silicon, 0.06 to 0.2 weight percent carbon, 0.01 to 2 weight percent titanium, and 1 to 8 weight percent nickel which overlaps "in weight percent, up to 3 nickel, up to 3 manganese, up to 0.7 silicon, up to 0.07 nitrogen, up to 0.07 carbon and up to 0.5 titanium, as instantly claimed (abstract).

In regards to claim 22, Matsui et al. (JP ‘092) discloses 15 to 27 weight percent chromium, 0.01 to 2 weight percent aluminum and 0.001 to 0.05 weight percent rare earth metals, which includes cerium and lanthanum, which overlaps "in weight percent, about 22 chromium, about 0.6 aluminum, cerium and lanthanum, wherein the sum of the weights of cerium and lanthanum is up to about 0.10" ([0013], [0017] and[0019]).

In regards to claim 25, Szummer et al. discloses electropolishing a ferritic stainless steel in a sulfuric acid solution with platinum (Materials and experimental procedure).

With respect to the amended recitation “wherein electropolishing the at least one exposed surface improves resistance of the at least one surface to oxidation when

subjected to a temperature and an atmosphere characteristic of operating conditions within a solid oxide fuel cell" of claim 26, the Examiner notes Szummer et al. in view of Matsui et al. (JP '092) discloses the same or a substantially similar composition and the same processing. Therefore, this property would be expected. MPEP 2112.01 I.

In regards to claim 99, Szummer et al. discloses a method for preparing ferritic stainless steels containing 16 weight percent, 17 weight percent and 19.3 weight percent chromium (page 356, column 2). Ono (JP '103) discloses 15 to 30 weight percent chromium, 0 to 1 weight percent aluminum and 0 to 0.2 weight percent rare earth metals ([0013], [0017] and [0019]).

Matsui et al. (JP '092) discloses adding 0.01 to 2 weight percent aluminum, in order to improve high temperature oxidation (corrosion) resistance, and 0.001 to 0.05 of rare earth metals such as yttrium, in order to improve the oxide film, to stainless steel having 20 to 80 volume percent ferritic phase (ferritic stainless steel) and 15 to 27 weight percent chromium (abstract and [0018]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added 0.01 to 2 weight percent aluminum and 0.001 to 0.05 weight percent rare earth metals such as yttrium, as disclosed by Matsui et al. (JP '092), to the ferritic stainless steels, as disclosed by Szummer et al., in order to maintain high temperature oxidation resistance and improve adhesion of the oxide film, as disclosed by Matsui et al. (JP '092) (abstract and [0018]).

With respect to the recitation "wherein the electropolishing decreases the rate of oxidation of the ferritic stainless steel by at least one order of magnitude when

compared to a non-electropolished sample of the same ferritic stainless steel, when heated in an oxidizing atmosphere at a temperature in the range of 750°C to 850°C" in claim 101, the Examiner notes that Szummer et al. in view of Matsui et al. (JP '092) discloses the same or a substantially similar composition and the same processing. Therefore, this property would be expected. MPEP 2112.01 I.

Response to Arguments

Applicant's arguments filed 28 August 2009 have been fully considered but they are not persuasive.

First, the Applicant primarily argues that a person skilled in the art would have understood the present inventor to have been in possession of a method for making a ferritic stainlesss steel article having an uncoated electropolished oxidation resistant surface since the ferritic stainless steel was cast, hot reduced, cold rolled, annealed, ground, and electropolished.

In response, the Examiner notes that any negative limitation or exclusionary proviso must have basis in the original disclosure. MPEP 2173.05(i). Since the instant specification does not recite "without a coating" or "uncoated", this limitation does not have basis in the original disclosure.

Second, the Applicant primarily argues that since Ishibashi ('311) discloses (1) subjecting the surface to a wet or dry chemical treatment, such as by applying to a particular acidic or alkaline oxidizing composition to the surface; (2) using vacuum

evaporation coating techniques, such as "spattering" or arc discharge techniques; (3) adhering metal oxide powders to the surface using a polymeric or other binder that is relatively transparent to infrared radiation: and (4) simultaneously adhering and oxidizing a stainless steel coating on the mirror-like surface, such as by “chromalyzing” or cladding, the processed surface of the substrate in Ishibashi (‘311) is not left exposed, but instead is actively coated with a relatively thick layer of a metal oxide material having certain spectral properties facilitating absorption of solar radiation by the surface. The Applicant further argues that the use of the term "uncoated” in claim 11 is intended to mean that a material is not actively applied to or deposited on the surface as a film or other coating.

In response, the Examiner notes that Ishibashi (‘311) discloses electrolytically polishishing (electropolishing) ferritic stainless steel articles (which would include uncoated (exposed, as in amended claims 1, 10, 11, 13 and 26) ferritic stainless steel articles) used for a solar collector (col. 3, lines 28-53 and col. 7, lines 34-50). Although the Examiner acknowledges that portions of the disclosure of Ishibashi ('311) teach applying coatings to the ferritic stainless steel, since the claims recite the transitional language “comprising” and the intermediate product of Ishibashi (‘311) would be electropolished ferritic stainless steel (uncoated), Ishibashi (‘311) meets the claims. MPEP 2111.03.

Third, the Applicant primarily argues that it is incorrect that Ishibashi (‘311) discloses the same composition made by the same process because a broad range of compositions disclosed in the prior art would not be expected to inherently possess the

particular structure and properties exhibited by a specific composition, especially where the structure and properties are not even suggested in the prior art. The Applicant further argues that an obviousness rejection cannot be based on a theory of inherency.

In response, the Examiner notes that where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. MPEP 2112.01 I. Additionally, the Examiner notes that the references are drawn to ferritic stainless steels and not merely stainless steels in general and thus are not so broad so as to not have the claimed structure and properties.

`Fourth, the Applicant primarily argues that Ishibashi (‘311) discloses an extremely broad range of steel compositions that may include 0.001 to 5 weight percent aluminum and 0.001 to 5 weight percent yttrium and thus the chemistry of the stainless steel composition disclosed in Ishibashi (‘311) is extremely broad and there is no disclosure that would lead a person skilled in the art to experiment or otherwise determine the critical ranges for aluminum, chromium, and rare earth elements as recited in instant claims 1, 10 and 11.

In response, the Examiner notes that the normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages. MPEP 2144.05 II.

Fifth, the Applicant primarily argues that the only reference to electropolishing is in connection with the conventional reduction of surface roughness of a stainless steel substrate and Ishibashi (‘311) does not teach or suggest electropolishing an exposed surface, let alone electropolishing to chemically modify an exposed surface so that the surface will develop an oxidation resistant scale as recited in the claims.

In response, the Examiner notes that Ishibashi (‘311) discloses electrolytically polishing (electropolishing) ferritic stainless steel articles (which would include uncoated (exposed, as in amended claims 1, 10, 11, 13 and 26) ferritic stainless steel articles) used for a solar collector (col. 3, lines 28-53 and col. 7, lines 34-50). Although the Examiner acknowledges that portions of the disclosure of Ishibashi ('311) teach applying coatings to the ferritic stainless steel, since the claims recite the transitional language “comprising” and the intermediate product of Ishibashi (‘311) would be electropolished ferritic stainless steel (uncoated), Ishibashi (‘311) meets the claims. MPEP 2111.03.

Sixth, the Applicant primarily argues that claim 13, for example, recites that the “exposed electropolished surface develops an aluminum-rich oxide scale comprising iron and chromium and having a hematite structure, a_o in the range of 4.95 to 5.04Å and c_o in the range of 13.58 to 13.75 Å, when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C.” because in Ishibashi (‘311) the substrate surface is coated with a relatively thick coating of a predetermined material and the underlying substrate could not possibly develop an oxide scale having the features in claim 13.

In response, the Examiner notes that the recitation “when heated in an oxidizing atmosphere for at least 100 hours at a temperature in the range of 750°C to 850°C.” would not be an active step in the process as claimed and is therefore considered a property that would be the result from the electropolishing of a ferritic stainless steel. MPEP 2112.01 I.

Seventh, the Applicant primarily argues that Szummer et al. lacks any teaching, suggestion, or motivation whatsoever to use electropolishing on a ferritic stainless steel alloy comprising 0.2 to 1.0 weight percent aluminum, 16 to less than 30 weight percent chromium, and 0.02 to 1.0 weight percent total rare earth metal, to produce an oxidation resistant surface as recited in claims 1, 10 and 11 and as a result, the Office has failed to establish a *prima facie* case under §103(a).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Eighth, the Applicant primarily argues that Szummer et al. merely discloses the use of electropolishing in the manner of metallographic microscopic examination and there is absolutely no reason why a person skilled in the art would look to Szummer et al. to develop a “method for making a ferritic stainless steel article having an oxidation resistant surface” since there is no teaching or suggestion that electropolishing would be an effective means to prepare an oxidation resistant surface on ferritic stainless

steel, let alone teaching or suggesting the particular oxide crystal structure and the critical aluminum, chromium, and rare earth metal content.

In response, the Examiner notes that because Szummer et al. in view of Ono (JP '103), Linden et al. (WO '554), Uematsu et al. (JP '933), or Matsui et al. (JP '092) discloses electropolishing ferritic stainless steels having substantially the same composition as claimed, an oxidation resistant surface and a particular oxide crystal structure would be expected to form. With respect to the ranges of aluminum, chromium, and rare earth metal content, Applicant has failed to provide data showing the criticality of the ranges of aluminum, chromium, and rare earth metal content.

Ninth, the Applicant primarily argues that the Office has provided no explicit rationale as to why one skilled in the art, when considering Szummer et al. in view of Ono (JP '103) would have reason to electropolish a ferritic stainless steel other than for metallographic sample preparation. The Applicant further argues that the Office admits that none of the cited references teach or suggest the oxide scale having the composition and hematite structure that the present inventor discovered is formed when an electropolished surface comprising the composition recited in the claims is exposed to certain oxidizing conditions; an obvious rejection cannot be based on a theory of inherency; and the Office provides no evidence that the composition and hematite structure of the recited oxide scale, let alone the particular lattice parameters, were known or recognizable when the claimed invention was made.

In response, while the Examiner acknowledges that metallographic sample preparation would be a goal of Szummer et al. in view of Ono (JP '103), the Applicant's

arguments are unpersuasive because one skilled in the art would know that the electropolished steel of Szummer et al. in view of Ono (JP ‘103) would have the same properties as the instant invention because the same process is conducted on substantially the same composition. The PTO is unable to manufacture and provide products based on prior art references to compare structures formed with the structures in Applicant's claims.

Tenth, the Applicant primarily argues metallurgists did not believe that the high temperature oxidation resistance of ferritic stainless steels would be improved by electropolishing and the basis for discounting the declaratory evidence is improper and cannot be maintained. The Applicant further argues that the present record lacks any evidence whatsoever that would support a prior recognition or suggestion in the art that the oxidation resistance of ferritic stainless steels having the composition recited in the claims would be improved by electropolishing and thus the oxidation resistance results for electropolished ferritic stainless steel is unexpected and surprising.

In response, the Examiner notes that this is not persuasive because the Applicant has failed to set forth evidence that supports the position as to why metallurgists would not believe that high temperature oxidation resistance would not be improved by electropolishing. Further, electropolishing has been conducted on ferritic stainless steel prior to the filing the date of the instant application, as is disclosed in Szummer et al. and thus properties associated with electropolishing the same compositions as set forth in Szummer et al. in view of Ono (JP ‘103), Linden et al. (WO

‘554), Uematsu et al. (JP ‘933), or Matsui et al. (JP ‘092) would be the same. MPEP 2112.01 I.

Eleventh, the Applicant primarily argues that the Applicant shows in paragraphs [0052]-[0058] of the specification that the rate of oxidation of electropolished samples of a ferritic stainless steel having a composition that falls within the recited compositional range was several orders of magnitude lower than that of otherwise identical non-electropolished samples and this was unexpected because there is not disclosure in the prior art that teaches or suggests such an improvement due to electropolishing.

In response, the Examiner notes that to establish unexpected results over a claimed range, applicants should compare a sufficient number of tests both inside and outside the claimed range to show the criticality of the claimed range. MPEP 716.02(d)(II). Thus in order to show the criticality of the structures, Applicant should provide analyses of electropolished ferritic stainless steels having compositions within the claimed compositional range and also outside of the claimed compositional range to demonstrate the criticality of the claimed ranges.

Twelfth, the Applicant primarily argues that [0059]-[0064] shows that the reduction in oxidation rate appears to be unique to the electropolished surface; mechanical polishing does not produce such unexpectedly improved oxidation resistance; and mechanical polishing after electropolishing will reverse the unexpected improvement in oxidation resistance due to the electropolishing.

In response, the Examiner notes that Szummer et al. discloses mechanically polishing and then electrochemically polishing (pg. 356, col. 2). Thus, the improved

oxidation resistance would be present in the Szummer et al. in view of Ono (JP '103), Linden et al. (WO '554), Uematsu et al. (JP '933), or Matsui et al. (JP '092) and would not be reversed.

Thirteenth, the Applicant primarily argues that [0065]-[0068] of the specification shows an unexpected improvement in oxidation resistance due to the electropolishing results from the development of a particular surface scale, which is characterized as comprising aluminum, chromium, and iron, and having a hematite structure that is different from the surface of Fe_2O_3, alpha Cr_2O_3, and alpha Al_2O_3 and Applicant measured the lattice parameters of the unexpected oxide scale, and showed how the crystal structure differs from the Fe_2O_3, alpha Cr_2O_3, and alpha Al_2O_3.

In response, the Examiner notes that Szummer et al. in view of Ono (JP '103), Linden et al. (WO '554), Uematsu et al. (JP '933), or Matsui et al. (JP '092) would have the same processing as that of the instant invention with substantially similar compositions. Therefore, the same or substantially similar structures would be expected.

Rejoinder

In order to be eligible for rejoinder, a claim to a nonelected invention must depend from or otherwise require all the limitations of an allowable claim. MPEP 821.04. The allowability of claims 1 and 11 has not been indicated and therefore claims 6, 14, 23-24 and 27-28 are currently not being considered for rejoinder.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571)272-5938. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
Supervisory Patent Examiner, Art Unit 1793

/JR/